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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/085,052	03/01/2002	Tatsuhiko Okada	0234-0442P	8158

2292 7590 02/08/2005

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EXAMINER

DOVE, TRACY MAE

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 02/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/085,052

Applicant(s)

OKADA ET AL.

Examiner

Tracy Dove

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 18 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1,3-5,8,9,11,13-15,18,19 and 21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-5,8,9,11,13-15,18,19 and 21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

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### **DETAILED ACTION**

This Office Action is in response to the communication filed on 1/18/05. Applicant's arguments have been considered, but are not persuasive. Claims 1, 3-5, 8, 9, 11, 13-15, 18, 19 and 21 are pending.

#### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1/18/05 has been entered.

#### ***Double Patenting***

The double patenting rejection has been withdrawn. A proper terminal disclaimer was filed on 4/16/04.

#### ***Claims Analysis***

The limitation "to be accommodated to an apparatus" in claims 1 and 13 is not given patentable weight because it is an intended use limitation. The limitation "utilized as a power source of a portable device" in claims 5 and 15 is not given patentable weight because it is an intended use limitation. The claims are directed to a fuel cell.

#### ***Claim Objections***

Claim 1 is objected to because of the following informalities: the claim recites improper group language. Examiner suggests "at least one of the fuel electrode *or* the air electrode". Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 3-5, 8, 9, 11, 13-15, 18, 19 and 21 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 1 and 13 recite “wherein the fuel cell is flexible to be accommodated to an apparatus and operates at a temperature to cause output of electric power at 100°C or less”, which does not appear to be supported by the specification as filed. The specification states “the fuel cell of the present invention has high output density and low operating temperature of as low as 100°C (page 12). The phrase “as low as 100°C” is equivalent to 100°C or greater, not 100°C or less.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 4 and 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 4 recites the limitation "fuel" in line 1. There is insufficient antecedent basis for this limitation in the claim.

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Claim 4 recites the limitation "the surface" in lines 2 and 4. There is insufficient antecedent basis for this limitation in the claim. Furthermore, the fuel and oxidant are not contacting the same surface.

Claim 14 recites the limitation "fuel" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 14 recites the limitation "the surface" in lines 2 and 4. There is insufficient antecedent basis for this limitation in the claim. Furthermore, the fuel and oxidant are not contacting the same surface.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 13-15, 18 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Muthuswamy et al., US 6,060,188.

Muthuswamy teaches a cylindrical fuel cell having a cathode 23, a cathode catalytic layer 24, a polymer electrolyte 25, an anode catalytic layer 26 and an anode 27 (abstract). The anode is located on the outer side of the membrane and the cathode is located on the inner side of the membrane (Figure 2). Alternatively, the anode 37 may be located on the inner side of the membrane and the cathode 33 located on the outer side of the membrane (Figure 3). The catalyst layer is present on the side of an electrode that faces the electrolyte. Oxidant is evenly distributed to the cathode and fuel is allowed to pass to the anode (col. 3, lines 52-67). Methanol

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may be used as the fuel (4:17-20) and the membrane may be a perfluorosulfonic acid material (3:38-51). The fuel cell has a variable cross section (flexible) for creating a fuel cell that can fit easily into a contoured package (3:8-12).

Thus the claims are anticipated.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3-5, 8, 9, 11, 13-15, 18, 19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bass et al., US 6,001,500 in view of Muthuswamy et al., US 6,060,188.

Bass teaches a cylindrical (tubular) fuel cell comprising an anode containing an anode catalyst, a polymer electrolyte membrane and a cathode containing a cathode catalyst. The polymer electrolyte is between the anode and the cathode (abstract). The anode and cathode are gas diffusion electrodes preferably comprising carbon materials such as graphite, carbon fiber and carbon cloth (col. 2, lines 30-46). Catalyst particles are deposited onto the electrode surface and the particles may be a noble metal catalyst on carbon (col. 2, line 66-col. 3, line 3). The catalyst material is applied to the outside of the inner electrode (contacts polymer electrolyte) (col. 3, lines 28-33). The electrode and catalyst material may be applied directly to the membrane (col. 5, lines 5-7). Hydrogen gas contacts the anode (fuel electrode) and oxygen gas contacts the cathode (air electrode) (col. 8, lines 1-15). Each fuel cell is assembled using five layers (col. 4, lines 6-52). Figure 2 shows the cathode is provided on the outer surface of the

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membrane and the anode is provided on the inner surface of the membrane. The membrane has an inner diameter of up to about 2.16 mm and a thickness of 0.13 mm or less. The thickness is preferably about 0.09 mm (outer diameter of the membrane is  $2.16+0.09=2.25$  mm). Table 1 teaches the polymer electrolyte membrane fuel cell has a length of 25 cm (250 mm). The fuel cell may be used as a source of power for transportation (col. 1, lines 18-19). Bass teaches the absolute maximum temperature for a polymer electrolyte membrane fuel cell is 100°C. To avoid drying of the membrane, industry practice is to operate between 71-83°C (9:47-52).

Bass does not explicitly state the fuel on the inner side of the membrane is methanol.

However, Muthuswamy teaches a cylindrical fuel cell having a cathode 23, a cathode catalytic layer 24, a polymer electrolyte 25, an anode catalytic layer 26 and an anode 27 (abstract). The anode is located on the outer side of the membrane and the cathode is located on the inner side of the membrane (Figure 2). Alternatively, the anode 37 may be located on the inner side of the membrane and the cathode 33 located on the outer side of the membrane (Figure 3). The catalyst layer is present on the side of an electrode that faces the electrolyte. Oxidant is evenly distributed to the cathode and fuel is allowed to pass to the anode (col. 3, lines 52-67). Methanol may be used as the fuel (4:17-20) and the membrane may be a perfluorosulfonic acid material (3:38-51).

Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because Muthuswamy teaches it is known in the art that tubular polymer electrolyte membrane fuel cells (PEMFC) may use methanol as the fuel. One of skill would have been motivated to use hydrogen or methanol as the fuel for the tubular PEMFC of Bass because Muthuswamy teaches hydrogen or methanol may be used as the fuel

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along with air as the oxidant (4:17-20). Both Bass and Muthuswamy are directed toward tubular/cylindrical fuel cells.

***Response to Arguments***

Applicant's arguments filed 12/16/04 have been fully considered but they are not persuasive.

***Bass '500***

Applicant's arguments with respect to claims 1, 3-6, 8-16 and 18-21, as being anticipated by Bass, have been considered but are moot in view of the new ground(s) of rejection.

***Muthuswamy '188***

Applicant argues the fuel cell of Muthuswamy is not flexible because the fuel cell has a rigid central core. However, rigid does not equate to non-flexible. Furthermore, Muthuswamy teaches the fuel cell has a variable cross section (flexible) for creating a fuel cell that can fit easily into a contoured package (3:8-12).

The 35 U.S.C. 103(a) rejection of claims 7 and 17 is withdrawn because the claims have been canceled.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is 571-272-1285. The examiner can normally be reached on Monday-Thursday (9:00-7:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Tracy Dove', with a stylized, flowing script.

Tracy Dove  
Patent Examiner  
Technology Center 1700  
Art Unit 1745

February 6, 2005